

We claim:

1. A laminate film comprising:

a) A polyolefin polymer layer having a surface treated by a flame or corona discharge treatment method and biaxially oriented at about 5.5 – 10.0 stretch ratio in the machine direction and about 7.0 – 12.0 stretch ratio in the transverse direction which imparts superior machine direction tensile properties such as Young's modulus of about 350,000 to about 400,000 psi or greater, elongation of 120% or less, and tensile strength of about 27,000 to about 30,000 psi or greater; and

b) A metal layer having an optical density of at least about 1.8 deposited on said treated surface of said polyolefin-based resin layer.

2. The laminate film of claim 1, further comprising:

a) A heat sealable polyolefin polymer layer or winding layer comprising at least an antiblock component selected from the group consisting of amorphous silicas, aluminosilicates, sodium calcium aluminum silicate, a crosslinked silicone polymer and polymethylmethacrylate.

3. A laminate film comprising:

a) A first polyolefin polymer layer having a first surface and a second surface and biaxially oriented at about 5.5 – 10.0 stretch ratio in the machine direction and about 7.0 – 12.0 stretch ratio in the transverse direction which imparts superior machine direction tensile properties such as Young's modulus of about 350,000 to about 400,000 psi or greater, elongation of about 120% or less, and tensile strength of about 27,000 to about 30,000 psi or greater;

b) A second polyolefin polymer layer disposed on the first surface of said first polyolefin polymer layer having a flame or corona discharge-treated surface on said second polyolefin polymer layer disposed on the side opposite that of the first polyolefin layer;

c) A metal layer having an optical density of at least about 1.8 deposited on said second polyolefin polymer layer; and

*Sabat* d) A heat sealable layer or a winding layer disposed on the second surface of said first polyolefin polymer layer.

4. The laminate film according to claim 1, wherein said polyolefin polymer layer has a thickness of about 6 to about 40  $\mu\text{m}$ .
5. The laminate film of claim 1, wherein said polyolefin polymer layer comprises a polypropylene polymer.
6. The laminate film of claim 2, wherein said heat-sealable layer or winding layer has a thickness of about 0.5 to about 5.0  $\mu\text{m}$ .
7. The laminate film of claim 2, wherein said heat sealable or winding layer comprises an anti-blocking agent of about 0.05 to about 0.5 percent by weight of said heat sealable or winding layer.
8. The laminate film of claim 2, wherein said heat sealable layer comprises a ternary ethylene-propylene-butene copolymer.
9. The laminate film of claim 2, wherein said winding layer comprises a crystalline polypropylene or a matte layer composed of a blend of propylene polymers and one or more other polymers and/or elastomers having a roughened surface.
10. The laminate film of claim 2, wherein said winding layer is treated to provide a surface receptive to lamination or coating with adhesives or inks.
11. The laminate film of claim 1, wherein said metal layer has a thickness of about 5 to about 100 nm.
12. The laminate film of claim 1, wherein said metal layer has an optical density of about 1.8 to about 5.0.
13. The laminate film of claim 1, wherein said metal layer comprises aluminum.
14. The laminate film of claim 3, wherein said second polyolefin resin layer comprises additives that enhance metal adhesion or metal formation.
15. The laminate film of claim 3, wherein said second polyolefin resin layer comprises at least an antiblock component selected from the group consisting of amorphous silicas,

aluminosilicates, sodium calcium aluminum silicate, a crosslinked silicone polymer and polymethylmethacrylate.

16. The laminate film of claim 3, wherein said second polyolefin resin layer has a thickness of about 0.2 to about 5.0  $\mu\text{m}$ .
17. The laminate film of claim 3, wherein said second polyolefin polymer layer comprises a polypropylene polymer.
18. The laminate film of claim 3, wherein said second polyolefin polymer layer comprises a propylene-based copolymer comprising ethylene in amounts of about 0.5 to about 10% ethylene.
19. The laminate film of claim 15, wherein said antiblock component comprises about 0.01 to about 0.5 percent by weight of said second polyolefin polymer layer.
20. The laminate film of claim 14, wherein said second polyolefin layer comprises an additive selected from the group consisting of petroleum hydrocarbon resins and terpene resins.
21. The laminate film of claim 19, wherein the additive comprises about 5 to about 30 percent by weight of said second polyolefin polymer layer.
22. The laminate film of claim 14, wherein said second polyolefin polymer layer comprises an additive selected from the group consisting of linear crystalline polyethylene waxes, branched polyethylene waxes, hydroxyl-terminated polyethylene waxes, and carboxyl-terminated polyethylene waxes.
23. The laminate film of claim 21, wherein said additive comprises about 1 to about 15 percent by weight of said second polyolefin polymer layer.
24. A laminate film comprising:
- a) A polyolefin polymer layer having a flame or corona discharge-treated surface and biaxially oriented at about 5.5 – about 10.0 stretch ratio in the machine direction and about 7.0 – about 12.0 stretch ratio in the transverse direction which imparts superior machine direction tensile properties such as Young's modulus of about 350,000 to about 400,000 psi or greater, elongation of about 120% or less, and tensile strength of about 27,000 to about 30,000 psi or greater; and

b) a metal layer having an optical density of at least about 1.8 deposited on said discharge-treated surface, and wherein

c) laminate film has a barrier durability of about 60 cc/m<sup>2</sup>/day or less oxygen transmission through the laminate film when elongated at about 11,000 g<sub>f</sub> / 4.75" film width elongation force.

25. The laminate film of claim 23, further comprising:

a) A heat sealable layer or winding layer comprising at least an antiblock component selected from the group consisting of amorphous silicas, aluminosilicates, sodium calcium aluminum silicate, crosslinked silicone polymers and polymethylmethacrylate.

26. A laminate film comprising:

a) A first polyolefin polymer layer having a first surface and a second surface and biaxially oriented at about 5.5 – about 10.0 stretch ratio in the machine direction and about 7.0 – about 12.0 stretch ratio in the transverse direction which imparts superior machine direction tensile properties such as Young's modulus of about 350,000 to about 400,000 psi or greater, elongation of about 120% or less, and tensile strength of about 27,000 to about 30,000 psi or greater;

b) a second polyolefin polymer layer disposed on the first surface of said first polyolefin resin layer;

c) a metal layer having an optical density of at least about 1.8 deposited on said second polyolefin resin layer; and

d) a heat sealable layer or a winding layer disposed on the second surface of said first polyolefin resin layer;

e) wherein the laminate film has a barrier durability of about 60 cc/m<sup>2</sup>/day or less oxygen transmission through the laminate film when elongated at about 11,000 g<sub>f</sub> / 4.75" film width elongation force.

27. The laminate film according to claim 24, wherein said polyolefin polymer layer has a thickness of about 6 to about 40 μm.

28. The laminate film of claim 24, wherein said polyolefin polymer layer comprises a polypropylene resin.
29. The laminate film of claim 25, wherein said heat-sealable layer or winding layer has a thickness of about 0.5 to about 5.0  $\mu\text{m}$ .
30. The laminate film of claim 25, wherein said heat sealable or winding layer comprises an anti-blocking agent of about 0.05 to about 0.5 percent by weight of said heat sealable or winding layer.
31. The laminate film of claim 25, wherein said heat sealable layer comprises a ternary ethylene-propylene-butene copolymer.
32. The laminate film of claim 25, wherein said winding layer comprises a crystalline polypropylene or a matte layer composed of a blend of propylene polymers and one or more other polymers and/or elastomers having a roughened surface.
33. The laminate film of claim 25, wherein said winding layer is treated to provide a surface receptive to lamination or coating with adhesives or inks.
34. The laminate film of claim 24, wherein said metal layer has a thickness of about 5 to about 100 nm.
35. The laminate film of claim 24, wherein said metal layer has an optical density of about 1.8 to about 5.0.
36. The laminate film of claim 24, wherein said metal layer comprises aluminum.
37. The laminate film of claim 26, wherein said second polyolefin polymer layer comprises additives that enhance metal adhesion or metal formation.
38. The laminate film of claim 26, wherein said second polyolefin polymer layer has a thickness of about 0.2 to about 5.0  $\mu\text{m}$ .
39. The laminate film of claim 26, wherein said second polyolefin polymer layer comprises a polypropylene polymer.
40. The laminate film of claim 3, wherein said second polyolefin polymer layer comprises a propylene-based copolymer with ethylene in amounts of about 0.5 to about 10% ethylene.

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| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |      |